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A SUGGESTED METHOD FOR ELIMINATING THE EFFECTS OF VARYING TRANSPARENCY OF THE AIR AND OF POSSIBLE VARIABILITY OF COMPARISON STARS IN SENSITIVE PHOTOMETRIC OBSERVATIONS.

By C. D. Perrine.

The wonderful accuracy obtained in the first experiments with the new photo-electric cell opens up an entirely new field of possibilities. At the same time such accuracy points to the necessity of taking precautions to eliminate small sources of error which heretofore have been neglected.

It has been for a long time common suspicion that sufficiently sensitive methods might reveal slight fluctuations in most of the heavenly bodies. It may be that the new cell is sensitive enough to make the finding of comparison stars which are sufficiently invariable in brightness, difficult or perhaps practically impossible.

This difficulty could, to a great extent, at least be overcome by using a number of comparison stars and depending upon the mean to be constant.

There is, however, a method which I think can be used to eliminate at once errors of the above nature and also variations of transparency of the air, and with little extra work.

If we integrate the light from a considerable area of stars and sky (say of one-half degree or more in diameter according to the requirements of the case), we should have a very constant source of comparison. Such a source should also eliminate variations in the transparency of the atmosphere.

The simplest and best method of integration would seem to be to project the region of sky (either in focus or out-of-focus) directly upon the sensitive surface of the cell when this can be done. For very large regions of sky this might be difficult.

In such cases very short focus lenses or mirrors might be used for standardizing. In fact, it seems probable that for such purpose entirely auxiliary apparatus may be found most satisfactory.

Observatorio Nacional Argentino,
Córdoba, February 8, 1914.